"Design and Implementation of Web based Algorithm for the Automatic Analysis of the Performance based System Staff Appraisal (PBSA)"

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Abstract:- It is very essential to improve the academic and research activities in today's situation to enhance the competitiveness of the higher education institutions. PBSA is one of the solutions for this which we are proposing in this paper. Corporate endurance and expansion mainly depends on knowledge of staff and the yield of knowledge depends on quality and quantity of enterprise incentives for them. PBSA method is very useful for this. Performance appraisal is part of career development and consists of standard reviews of staff's job performance within institute. Using pre-established criteria the ranks and ratings will be allotted to faculties among the group of staffs. This will be useful for recognizing staff's performance and to provide salary hike/promotion to any staff. In the paper "DESIGN AND IMPLEMENTATION OF WEB BASED ALGORITHM FOR THE AUTOMATIC ANALYSIS OF THE PERFORMANCE BASED SYSTEM STAFF APPRAISAL (PBSA)" we are going to launch a website which allows automatic evaluation and analysis of staff's performance, work done by him and target achieved in given period of time which will be helpful to rate him. Main aim of this project is to reduce human errors and manual efforts need to manage the details. Some institutions uses performance appraisal process, in order to calculate the employees' efficiency and productivity for planning their promotion procedure. According to recent evolution process this process was carried out just by the executive staff, but recently it has evolved to an evaluation process based on the view of different reviewers, supervisors, collaborators, clients and the employee himself. In this evaluation process the reviewers evaluate some criteria's related to the employee performance appraisal. The reviewers involved in this evaluation process might have dissimilar measure of knowledge about the evaluated employee. It is a flexible framework in which different reviewers can convey their assessments in different domains according to their knowledge, i.e., an assorted evaluation framework. The final agenda is to design an performance appraisal system that computes a final evaluation for each employee. That will be used by the management team to make their decisions concerning their incentive and promotion guidelines.

Keywords: PBSA(Performance Based Staff Appraisal), Academic, Academic Support, Academic Growth, Research

Activity, Extension and Consultancy, Governance and Leadership.

1. INTRODUCTION

A performance based system staff appraisal (PBSA), is a method by which the job performance of staff is documented and evaluated. It is also referred to as a performance review, performance evaluation. PBSA is a systematic (general and periodic) yearly process that assures an individual's performance and productivity in relation to certain pre-established criteria and organizational objectives. However, other aspects of an individual are considered as well, such as his/her potential for future implement, overcoming weakness, strengthening one's skill set in teaching field and working environment. Main idea behind the introduction of PBSA is to bring quality in academic. Surely this will secure the academics with good ranking in NIRF, NBA etc. Performance appraisals are a part of career development and consist of regular reviews of staff performance within organizations.

The main intention of this project is:

- o Faculty can update their appraisal performance index through online.
- o Automatic analysis, evaluation and report generation without human intervention.

The final aim is to design a performance appraisal model in such a framework that computes a final evaluation of each employee. That will be used by the management team to make their decisions regarding their incentive and promotion policy.

In classical performance appraisal methods just superiors evaluates faculties. However, organisations are adopting new methods that use information from different people (appraisers) connected with each evaluated faculty. In

Special Issue - 2018

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICRTT - 2018 Conference Proceedings

fact, the 360-degree appraisal is a procedure for evaluating faculty's performance that includes the opinions of superiors, collaborators, colleagues and themselves. Then, each reviewer from the different reviewers' co-operatives estimates indicators used for measuring the performance appraisal of the estimated faculty. Usually these indicators include uncertainty and might have different nature (qualitative or quantitative).

Most of current evaluation practices need quantitative values for the appraisers' valuations. Due to the fact that different sets of appraisers are involved in the 360-degree appraisal or integral estimation, the use of a unique particular scale cannot be suitable because different appraisers can have different proficiency and degree of knowledge about the indicators and evaluated faculty. From this point of view, we consider that the use of different scales and domains (heterogeneous information) in the evaluation framework adapted to each appraiser or appraisers' collective would be helpful for them and improve the final outcomes. We will then derive a heterogeneous framework in which appraisers may express their valuations by means of numerical, interval-valued or verbal information. Therefore the main goal of this paper is to deliver a performance appraisal process that takes into account the above considerations. To do so, we present an evaluation method defined in a framework in which different expression domains can be used by appraisers to express their assessments. Subsequently, the evaluation method should manage this heterogeneous information in order to obtain a global evaluation. Then, it is essential to combine the initial information in a common domain. In this way, the projected method will conduct all evaluations provided by reviewers as undefined sets in the common domain to calculate such global evaluation that will allow to the organisation team to make the ultimate conclusion. Thus, the problem falls, in a natural way, into the combined decision making context.

2. LITERATURE SURVEY

In the context of global knowledge economy, it is of both urgency and utmost significance to improve the academic and research capabilities of the teachers so as to boost the holistic competitiveness of the higher-education institutions. A solution to it lies in the adoption of a well- constructed academic staff performance appraisal system. Based on the review of history and state-of-art of performance appraisal at universities, the framework and process of academic staff performance appraisal system is designed, while a general model of appraisal criteria have also been constructed. In this era of the knowledge economy, corporate survival and development is closely related with the knowledge staffs. In view of the current problems of knowledge-based business in staff motivation, this paper puts forwards several proposals from aspects of incentive mechanism, incentive intensity, incentives measures, social security system, human resource development, and performance

appraisal feedback mechanism[1]

Performance appraisal is a process used in some institutions in order to evaluate the faculty's efficiency and productivity for planning their promotion policy. Initially this process was carried out just by the executive staff, but recently it has evolved to an evaluation process based on the opinion of different reviewers, supervisors, collaborators, clients and the staff himself. In such a evaluation process the reviewers evaluate some indicators related to the staff's performance appraisal. The sets of Reviewers involve in the evaluation process might have different degree of knowledge about the evaluated staff. It then seems suitable to offer a flexible framework in which different reviewers can express their assessments in different domains according to their knowledge. The final aim is to design a performance appraisal model in such a framework that computes a final evaluation of each employee. That will be used by the management team to make their decisions regarding their incentive and promotion policy[2]

One of the main challenges of institutions is the improvement of their efficiency. Performance appraisal is essential for the effective management of institutions. Recently more and more institutions are trying to increase their efficiency through the staff performance measurement. Performance appraisal is used for the evaluation of staffs, estimating their contributions to the goals of the institutions, behavior and results. This evaluation process has been accomplished from different point of view among others. In classical performance appraisal methods just supervisors evaluates staffs. However, nowadays they are adopting new methods that use information from different people (appraisers) connected with each evaluated faculty [3]

Eg : The 360-degree appraisal is a methodology for evaluating staff's performance that includes the opinions of supervisors, collaborators, customers and themselves . Then, each reviewer from the different reviewer's collectives evaluates indicators used for measuring the performance appraisal of the evaluated staff. Usually these indicators involve uncertainty and might have different nature (qualitative or quantitative). Most of current evaluation processes require quantitative values for the appraisers' assessments [3]

Academic staffs in universities are the key to the core competitiveness of a higher education institution. Therefore, it is of both urgency and utmost importance to improve the academic and research capabilities of the teachers so as to boost the holistic competitiveness of the institution. A solution to it lies in the adoption of a well- constructed academic staff performance assessment system, which will integrate control. The system is aimed at creating a teaching context in which the academic staff can make a full play of their creativeness and initiatives to boost the development of teaching. Based on the characteristics of the teachers and the issues in the current practice of performance assessment, the paper proposes a design of the appraisal[4]

Performance appraisal at a majority of the universities

Special Issue - 2018

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICRTT - 2018 Conference Proceedings

still consist of the conventional annual work report and the assessment after a tenure is completed, which is generally a quantifiable description of an academic staff's teaching and research work . The deficiency of such a method lies in a lack of overall assessment of the staff's performance; therefore it is of great significance to design a new system of performance appraisal based on the existing information system while giving full consideration to the context of a digital campus. The system is characterized by scientifically designed criteria applied in a digital network environment. Methods, Procedures and Indicators of Appraisal Performance appraisal or performance assessment refers to the examination and evaluation of staff's work via predetermined standards and procedures to assess his/her commitments to the post, the individual capability and performance. Various methods of appraisal have been used based on the management practices and the theoretical categorization of them. The most commonly applied methods are Balanced Scorecard (BSC), 360 Degree Appraisal, Management By Objectives (MBO) and Key Performance Indicators (KPI). Performance appraisal at universities is often a process of comprehensive evaluation of the one's teaching, research.[5]

3. METHODOLOGY

A performance based system staff appraisal is a method by which the job performance of a staff is documented and evaluated. The performance analysis is done on the ratings the staff has achieved by the work done and the target achieved in a certain period of time. The steps included in this method are:
- Information collection
- Building the database
- Rating according to the criteria
- Statistical analysis of the reports
- Generation of the reports
- Graphical representation and statistical representation
- Announcement of results

The result is analyzed based on the staff's performance in academic, academic support, extensive activity they were involved in, their researches as well as governance and their leadership in various events. All the necessary information is collected and grouped based on the criteria.

3.1 DATAFLOW DIAGRAM
Faculty information collection: Information pertaining to each faculties collected to build their individual profile. The collected information is used for managing the process of faculty appointments, appraisals and other actions.

Building database: The collected faculty information is stored in the database for the further processes. In this task we will create a schema for the college database and load data in to the database. Database management

system software is used to setup a database. Creating a database requires planning and gets to know what kind of data will be included.

i.*Academic:* Most important of academic criteria are importance of academic intension, innovation in the approach to the subject, coherence of the syllabus, creativeness, intelligence and evidence of the instructors confidence. It contains fields like student feedback, how much the faculty has used library, end result of the semester and classes conducted by the faculty.
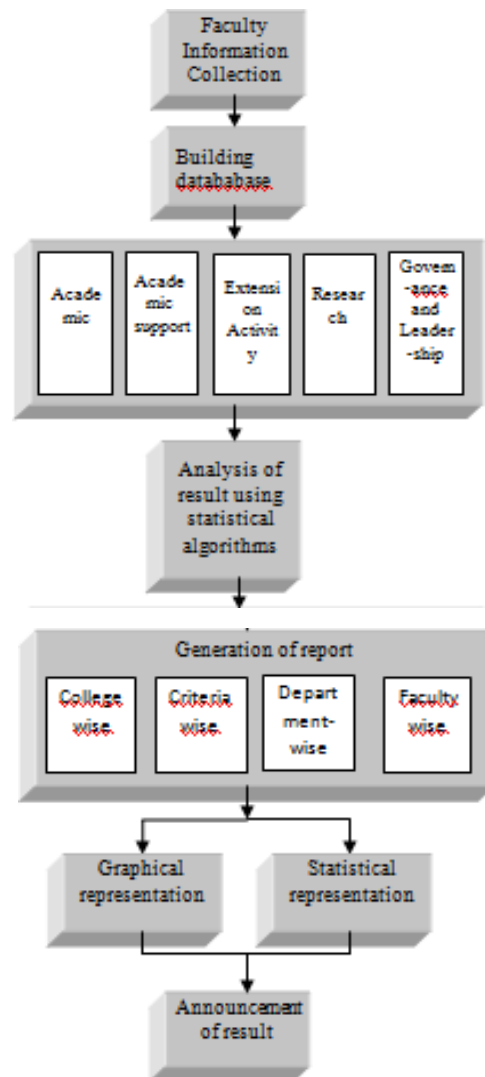

Figure 3.1:Dataflow diagram

ii.*Academic support:* The term academic support refer to a wide variety of instructional methods, educational services or institutional resources provided to students in the effort to help them speed up their learning progress, meet learning standards. The academic support encompasses a broad array of educational strategies, including tutor sessions, supplemental courses, learning experiences, teacher advisors and volunteer mentors, Teaching aids/techniques as well as substitute ways of grouping, counseling and instructing students.

Special Issue - 2018

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICRTT - 2018 Conference Proceedings

iii. *Extension activity:* Extension activity provides a link between the college and society in order to create socially sensitive citizens. The students are made aware of common extension activities like NCC, NSS etc. It includes academic activities outside the campus, consultancy/outreach programs(sharing subject knowledge with other academic institutions/public) and it also contains organization of seminars/conferences in the college.

iv. *Research:* Research includes study of materials and sources in order to establish facts and reach new conclusions and also to gain knowledge. It contains fields like research publications, international journals, national publications, paper presented in national/international conferences, minor and major research projects, presentation of research paper by students in external seminars.

v. *Governance and Leadership***:** Governance deals with establishment of policies and continuous monitoring of their proper implementation by the members of the governing body of an organization. Leadership is the action of leading a group of people or an organization or the ability to do this. Leaders help themselves and others to do the right things. They set direction, build an inspiring vision and create something new. Here the points are credited based on their position in the institution. Positions like vice-principal/dean, hod, college level committees/NCC/NSS/placement cell, mentorship programs, CL/RH remaining.

vi.

Analysis of the result using statistical algorithms: After all the data has been entered into the database analysis and calculation of the result can be performed using some basic mathematical operations as mentioned in the algorithm.

i. *Faculty wise* **:** Ratings are based on the individual performance of each staff where in we can use the obtained result for their appraisals or other purposes.

ii. *Criteria wise:* There are many criteria for the information storing, based on which the details are stored. A comparison of results or performance of an individual can be made by generating overall reports of each criteria.

iii. *Department wise* **:** A brief performance progress overview of each department can be obtained by gathering the results of all its staff and depicting it in a statistical or graphical manner. This gives a clear picture of comparison between departments.

iv. *College wise:* This method of analysis can be performed not only on individual staff but also at college level i.e we can generate reports pertaining to each college by accumulating the result of all the employees of that institution.

Generation of the report:

i. *Graphical representation:* It is the another way of analyzing numerical data. Graph is a sort of chart through which statistical data represented in the form of lines or curves drawn across the coordinated points plotted on its surface. Graphs enable us in studying the cause and effective relationship between two variables. They give clear account and precise picture of problem. Graphs are also easy to understand and eye catching. It is more often and effective than presenting data in tabular form. There are different type of graphical representation and which is used depends on nature of data and nature of statistical result.

i. *Statistical representation:* The statistician is often faced with the task of summarizing large amount of data in a compact format that yields meaningful information concerning the data. Without displaying the values for each observation taken from the population, it is possible to present the data concisely and meaningfully using certain procedures. Such procedures often involve frequency distributions or graphs of data. There are several different type of charts and graphs. The four most common are line graph, bar graph, histograms and pie charts. The data is represented by symbols, such as bars in bar chart, lines in line chart or slices in pie chart.

Result announcement: The final outcome of the process is result. It is helpful for the salary hike or promotion of the faculty. The result is calculated using pre-established criteria. The results might be in the form of grade points, statistical representations or graphical charts.

4. RESULTS AND DISCUSSION

Based on the calculations carried out on example data in Table 4.1, we obtained the result as shown in Table 3. The Table 4.2 is considered as a reference for analyzing the grade. Table 4.3 shows the final result obtained.

Sl no	Category PART A	Actual Score	Marks out of 10 X	WEIGHTAGE W	(WX)
1.	Academic	A= 346.1	10	40	400
2.	Academic support	B= 44	4.4	15	66
3.	Research	C= 12	10	25	37.5
4.	Extension and consultancy	D= 100	10	10	100
5.	Academic growth	E= 47	3.7	5	23.5
6.	Governance and leadership	F= 72	7.2	5	36
	Total score	G= 621.1	---------	∑W=100	∑WX=663.
			Over all CGPA out of 10		∑WX/∑W=6.63

Table 4.1: Summary

The Table 4.1 shows the overall summary of the calculations done throughout the analysis. It stores the actual score of each and every category. The actual score is taken from the previous databases and then it is reduced to 10. It is denoted as X. Weightage column contains constant data. The final column is obtained by multiplying weightage and reduced actual score. The overall calculation of CGPA is obtained by adding these values. It gives the actual grade.

Special Issue - 2018

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICRTT - 2018 Conference Proceedings

Sl no	Over all CGPA out of 10	Grade G
1	9.1 and above	A++
2	8.6-9	A+
3	8.1-8.5	A
4	7.6-8	B++
5	7.1-7.5	B+
6	6.6- 7	B
7	6.1-6.5	C++
8	5.6-6	C+
9	Less than 5.5	C

Table 4.2 :Pbsa grading

The Table 4.2 contains the references for PBSA grading. Through this table one can easily find his/her grade by comparing their score with the score in the table

Actual score G	Grade obtained
621.1	B

Table 4.3: Grade obtained

By referring Table 4.1 and Table 4.2, Table 4.3 can be filled. It gives final result obtained in the calculation analysis. This gives the final outcome of the faculty's overall performance in the particular academic year.

5. CONCLUSION

The principal purpose of an appraisal system should be to improve the employee and the organizational performance. The system must be based on a deep regard for people and recognize that employees are the most important resource. The system should first of all contribute to the satisfaction of all the employees. This theory will require a continuous effort in counselling, coaching and honest, open communications between the employee and supervisors. The findings of this research can be summarized as follows: The most common types of the performance appraisal employed in the organization are the Graphic Rating Scale and the Management by Objectives. In all the firms, a performance feedback is given to the employees once a year. In most of the companies, employees are asked to complete a self-assessment before the feedback session and managers are the only source used to rate the employees. Regarding the problems generated by the appraisal systems, we can distinguish five different types of problems: An unfair perceived performance appraisal system, the use of inconsistent criteria which may lead to negative attitude toward the appraisal system, unskilled appraisers who lack communication skills and consequently are not able to conduct an effective performance feedback, absence of tools aiming to improve the performance appraisal system and finally the lack of the senior management support. Finally, the findings of this research indicated many areas to be improved in the appraisal system such as the use of explicit evaluation criteria, an open and sincere feedback, a greater senior management support, a process perceived as being fair by employees and finally a structure in which improvements in performance appraisals may be facilitated.

REFERENCES

[1] Li Junfeng, Han Xiaoting, Zhou Ning."Constructing Performance Appraisal System at the Tertiary Level: a Focus on the Academic Staff", 2011.

[2] Xiong Kai ,"Study on the Incentive Strategies of Knowledge Employees", 2010.

[3] R.de Andres Calle, J.L. Garcıa-Laprest, L.Martınez, Jun Liu." Performance Appraisal with heterogeneous information", 2008.

[4] XuGuang-yu, ZHOU Ning, LIU Qing-jie."The Design of the Ideas and the Principles of Performance Appraisal System in Research- oriented Universities: Focus on Academic Staff ", 2010.

[5] Ning Zhou, Xiaoting Han, Xiaojun Zhang, GuangyuXu."Performance Appraisal System for Academic Staff in the Context of Digital Campus of Higher Education Institutions: Design and Implementation", 2009.